REMARKS

Claim 1-4, 6-13 and 15-20 are pending in this application, of which claims 1 and 11 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. No new matter has been added.

Claim Objections

Claims 1 and 11 have been objected to because of the following informalities: The recited limitations of "upper surface" and "top surface" are interpreted as having he same meaning, i.e., upper surface. The phrase containing the reference to "top surface" has been deleted from claim 1 and 11. Therefore, withdrawal of the objection to claims 1 and 11 is respectfully requested.

35 USC §112 Claim Rejections

Claims 1 and 11 are rejected under 35 USC §112, first Paragraph as failing to comply with the written description requirement. Specifically, the Examiner asserts that the specification fails to provide support for the claim limitation that requires that the top surface of the ridge come in contact with the current blocking layer.

This phrase has been deleted from claims 1 and 11. Therefore, withdrawal of rejection of claims 1 and 11 under 35 USC §112, first Paragraph is respectfully requested.

The Examiner indicates that the upper surface of the ridge is not in contact with the current blocking layer in the drawings.

In fact, after the SiO_2 film 30 is formed on the upper surface of the p-first GaN cap layer 8 of the ridge, the current blocking layer 9 is formed by a traverse growth technique, and thereafter the SiO_2 film 30 is removed. Then, the p-second GaN cap layer 10 is formed on the p-first GaN cap layer 8 in the opening and on the current blocking layer 9 (see Fig. 4(b) to Fig. 5(d)).

The specification recites that a ridge portion having an upper surface having a width W_1 is constituted by the p-first GaN cap layer 8 and the p-AlGaN cladding layer 7 (refer to the specification, page 19, lines 10-13).

Therefore, to be exact, it is considered that the end of the current blocking layer 9 is not in contact with the upper surface of the ridge but with the p-second GaN cap layer 10 on the upper surface of the ridge.

As will be discussed ahead claims 1 and 11 have been amended to recite this feature.

Claim Rejections under 35 USC §102 and §103

The present invention provides for an AlGaN cladding layer (7), a first GaN layer (8), covered by a current blocking layer (9). An opening (W_1) is provided in the current blocking layer (9) which is significantly smaller than the width (W_2) of the first GaN layer (8). As shown in Figure 2 and discussed on page 21, lines 5-16 of the specification the ratio of W_2 / W_1 is between 0.1 and 0.95 and preferably between 0.1 and 0.8. Further, a second GaN layer (10) is provided on top of the current blocking layer (9).

Kunisato et al. describes a nitirde semiconductor laser. As illustrated in Figure 4, formed on

a sapphire insulating substrate (31) are an undoped AlGaN buffer layer (32), an undoped GaN underlayer (33), an n-type GaN contact layer (34), and an n-type AlGaN cladding layer (35). Formed on the n-type AlGaN cladding layer (35) are an InGaN active layer (36), an undoped GaN cap layer (37), and a p-type AlGaN cladding layer (38). The p-type AlGaN cladding layer (38) has a flat region and a ridge region formed in the center of the flat region. A p-type GaN cap layer (39) is formed on the ridge region of the p-type AlGaN cladding layer (38). An n-type GaN or n-type AlGaN current blocking layer (40) is formed on the upper surface of the flat region and the side surfaces of the ridge region of the p-type AlGaN cladding layer (38) and on the side surfaces of the p-type cap layer (39). A p-type GaN contact layer (41) is formed on the p-type cap layer (39) and the n-type current blocking layer (40). A p-type electrode (42) is formed on the p-type GaN contact layer (41) and an n-type electrode (43) is formed on the n-type GaN contact layer 34.

It is noted in the Office Action that the Examiner does not discuss the current blocking layer being formed by a transverse growth technique. As indicated in the rejection of claim 11 the Examiner admits that Kunisato et al. does not disclose a traverse growth technique. Therefore the Examiner's grounds of rejection is respectfully traversed and the Examiner is requested to address this feature.

Referring to Fig. 4 of Kunisato et al. (U.S. 6,162,656), the Examiner appears to interpret a nitride semiconductor layer 32 with the composition of AlGaN and a p-type AlGaN cladding layer 38 as the ridge of the present invention, and that a p-type GaN cap layer 39 corresponds to the second semiconductor layer of the present invention. Thus, the Examiner considers that the width of the

opening of an n-type AlGaN current blocking layer 40 is smaller than that of the upper surface of the ridge.

Applicants believe that the difference between the present invention and Kunisato et al may be made distinctive by the amendments made to claims 1 and 11. Specifically, claims 1 and 11 patentably distinguish over the prior art relied upon by reciting, as exemplified by claim 1,

> "A semiconductor laser device comprising: a first nitride based semiconductor layer including a light emitting layer and containing at least one of indium, gallium, aluminum, boron and thallium; a ridge portion formed in a region having a predetermined width on said first nitride based semiconductor layer, having an upper surface having a first width and a side surface, and containing at least one of indium gallium, aluminum, boron and thallium; a current blocking layer formed on said first nitride based semiconductor layer and on a region from the side surface of said ridge portion to the upper surface thereof by a transverse growth technique, and having an opening having a second width smaller than said first width on the upper surface of said ridge portion; and a second nitride based semiconductor layer formed on the upper surface of said ridge portion and containing at least one of indium, gallium, aluminum, boron and thallium, wherein an end portion of said current blocking layer is in contact with a part of the upper surface of said second nitride based semiconductor layer formed on the upper surface of said nitride portion." (Emphasis Added)

As shown in Fig. 34C of Sugiura et al., it is a common practice to use SiO_2 in the growth of a current blocking layer; however, in general, the current blocking layer is grown such that the width W_1 be approximately the same as the width W_2. Thus, it definitely cannot be easily inferred by a person having ordinary skill in the art to specially form an overhung of the current blocking layer so as to satisfy the relation of $W_2 < W_1$ as applied in the present invention.

It is the applicant's understanding that Burnham et al. indicates that when a crystal if grown on a substrate on which a nonplanar ridge is formed, the ridge has its width become larger toward

upper layers by a traverse growth technique. Although it is found from Burnham et al. that the traverse growth technique has already been known for a while, it can never be easily inferred by a person having ordinary skill in the art to specially form an overhung of a current blocking layer so as to satisfy the relation of W_2 W_1 as applied in the present invention.

For the above reasons, Applicants do not believe that the present invention, as claimed in the amended claims, would have been anticipated by or obvious over the cited references.

Conclusion

In view of the aforementioned amendments and accompanying remarks, claims 1-4, 6-13 and 15-20, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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